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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,733	02/11/2005	Robert Crombach	4662-330	4375

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EXAMINER

LISTVOYB, GREGORY

ART UNIT	PAPER NUMBER
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1796

MAIL DATE	DELIVERY MODE
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12/03/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/501,733

Applicant(s)

CROMBACH ET AL.

Examiner

Gregory Listvoyb

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 10, 12 and 13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10, 12 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/17/2007 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-8, 10 and 12 rejected under 35 U.S.C. 102(b) as being anticipated by Berger et al (WO 9724389 and US Patent 5859177), herein Berger.

Berger discloses a process for increasing the molecular weight of a polyamide via solid-state post-condensation by exposing the polyamide prepolymer in the solid-state at elevated temperature to an inert gas atmosphere, wherein the process comprises a

step (a) wherein the gas atmosphere to which the polyamide is exposed has a dew temperature T_{dew-1} followed by a step (b) wherein the gas atmosphere to which the polyamide is exposed has a dew temperature T_{dew-2} , whereby T_{dew-1} is higher than T_{dew-2} , and wherein the gas atmosphere of step (a) has a temperature T_{gas-1} and the gas atmosphere in step (b) has a temperature T_{gas-2} such that T_{gas-1} is at least 10°C higher than T_{gas-2} and wherein at the end of step (a).

As evident from Figure 2 (below), Berger's process actually has three steps:

- 1) Initial heating for approximately 2 hours;
- 2) polymerization at 195°C for approximately 2 hours;
- 3) polymerization at temperature lower than 195°C for approximately 2 hours;

Steps (2) and (3) correspond with steps (a) and (b) of the Application's Claim 1, since Claim open language ("comprising") allows inclusion of additional steps to the process.

Berger discloses a process for postcondensation of polyamides, especially polyamide 6.6 granulate, in a fluidized bed reactor using nitrogen as the carrier gas.

On the first stage of the process Nitrogen gas is saturated with water at dew point about 80°C . The reaction temperature is within the range of $50-195^{\circ}\text{C}$ (Figure 2). At the second stage of the process the dew point of Nitrogen stream decreases from 80°C to 20°C . At the same time, the reaction temperature decreases to 58°C . Therefore, limitations of Claims 5-7 are met.

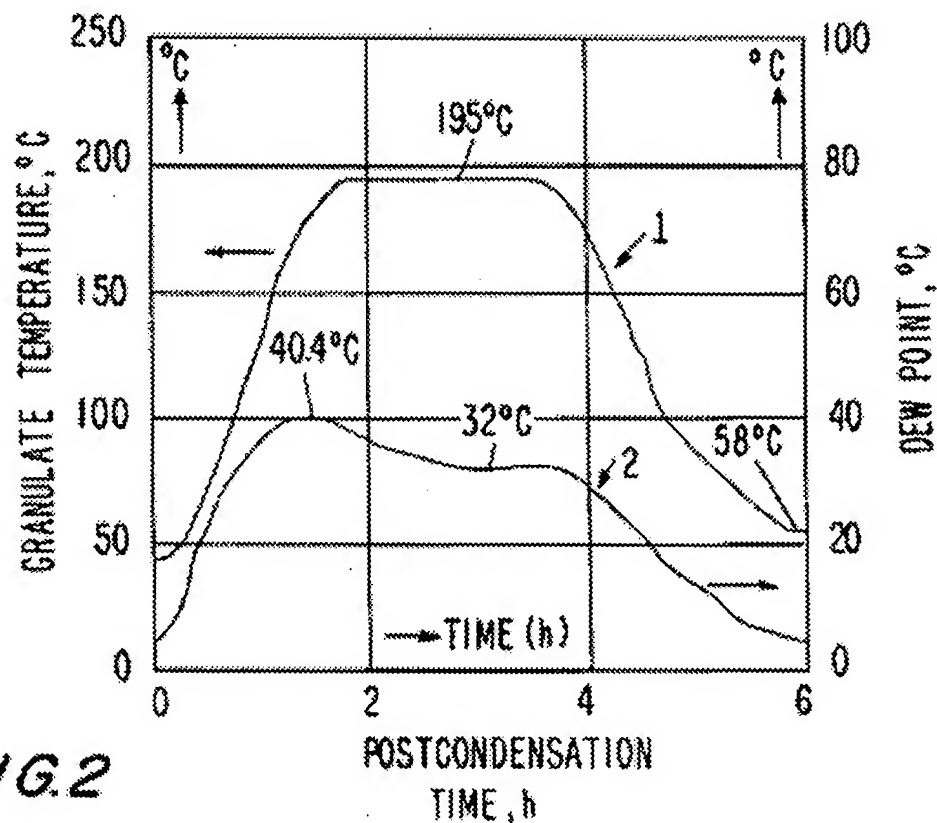


FIG. 2

Berger does not disclose that the polyamide has an intermediate-viscosity corresponding with a viscosity number VN_{int} and at the end of step (b) the polyamide polymer has an end-viscosity corresponding with a viscosity number VN_{end} , whereby Berger discloses, measured according to ISO 307.

However, since the process parameters completely meet the limitations of Claim 1 and polyamide undergoing the post-polycondensation is the same as one used in the application (polyamide 6,6, see Specification, page 7, line 10) VN_{int}/VN_{end} in Berger's process should be inherently the same as one in the Application examined.

Typical melting point of polyamide 6,6 is within the range of 250C-260C. Therefore, the limitations of Claims 3 and 8 are met.

Berger discloses that viscosity values of Polyamide 6,6 (meeting the limitations of Claim 4) are between 75.6 and 91.5. Therefore, the limitations of Claims 10 and 12 are met (Column 4, Table).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Berger in combination with Dujari et al (WO 9823666 and US Patent 5955569), herein Dujari.

Berger discloses a process for postcondensation of polyamides, especially polyamide 6.6 granulate, in a fluidized bed reactor using nitrogen as the carrier gas.

Berger does not disclose a solid phase polycondensation of polyamide 6 and presence of any additives in the polymer.

Dujari discloses a method for a solid state polymerization of polyamides. He teaches that the use of an ultra dry gas characterized by a dew point below 30C.

Dujari discloses that PA Mn values increase from 12.8 K to 14.5-25.1K, which corresponds with VN values increase on 10% (Example 1 and Table 1).

Dujary uses the pellets of low molecular weight poly(hexamethylene adipamide), nylon 6,6, polycaprolactam, nylon 6 with antioxidant (stabilizer) present (Figure 1, Column 4, line 10).

The above post-polymerisation is a nominal process for increasing molecular weight to values, not achievable by melt-polymerisation process. In the case of Polyamide 6 it allows to obtain a material with better mechanical properties, which is critical for fibers based on them.

Therefore, it would have been obvious to a person of ordinary skills in the art to apply Berger's post-polymerisation to polyamide 6 in order to obtain material with high molecular weight and good mechanical properties.

Use of antioxidants is also common for such a process. It allows preventing oxidative decomposition of the polymer and decreasing yellowness index.

Therefore, it would have been obvious to a person of ordinary skills in the art to use antioxidants in Berger's process in order to prevent oxidative decomposition of the polymer and decrease yellowness index.

Response to Arguments

Applicant's argument filed 10/17/2007 fully considered but they are not persuasive. Applicant stated that Berger does not teach two step polycondensation with certain ratio of polymer viscosity in intermediate and end steps of the process.

However, as discussed above, since the process parameters completely meet the limitations of Claim 1 and polyamide undergoing the post-polycondensation is the same as one used in the application (polyamide 6,6, see Specification, page 7, line 10) VN_{int}/ VN_{end} in Berger's process should be inherently the same as one in the Application examined.

The applicant states that " Berger et al teach that the post-condensation batch should have a (read: singular) desired dew point". In contrast Dew point of the gas in Berger's process changes during the process (see Figure 2).

The applicant argues that "Even if uncontrolled process variations disclosed in Berger et al could arguably be described as a "two step" process, which the applicants maintain is most certainly not the case, the difference between the dew points is less

than 10°C". This is incorrect. Most important parameters of Berger's process (gas Dew point and temperature) change step-wise. In addition difference between the dew points is more than 10°C (see Figure 2).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory Listvoyb whose telephone number is (571) 272-6105. The examiner can normally be reached on 10am-7pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Gregory Listvoyb
Examiner

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GL


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PRIMARY EXAMINER